

Application No. 10/620,729
Amendment dated February 17, 2007
Reply to Office Action of February 1, 2007

REMARKS

Status Of Application

Claims 1-12 are pending in the application; the status of the claims is as follows:

Claims 7 and 8 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention;

Claims 1, 2, 3, and 6-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al., U.S. Patent No. 6,424,877 B1 in view of Kawashima et al., U.S. Patent No. 6,079,862;

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., further in view of Fridge, U.S. Patent No. 5,638,461;

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., further in view of Fridge and Yamashita et al., U.S. Patent No. 6,584,219 B1;

Claims 9 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Greenberg et al., U.S. Patent No. 3,267,431;

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., further in view of Mertelmeier et al., U.S. Application Publication No. 2003/0081821;

Claim 12 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Geng, U.S. Patent No. 6,556,706 B1.

The acknowledgement, in the Office Action, of a claim for foreign priority under 35 U.S.C. § 119(a)-(d), and that the certified copy of the priority document has been received, is noted with appreciation. The indication, in the Office Action, that the Examiner has no objections to the drawings filed on July 16, 2003, is noted with appreciation.

By this response, claim 1 has been amended to more particularly point out and distinctly claim the present invention. No new matter has been added. Also by this response, new claims 13-30 have been added in order to provide a more adequate basis for protection for the current invention.

Telephone Interview:

The courtesy of Examiner Yuan to grant applicant's attorney a telephone interview on April 4, 2007 is noted with appreciation. The amendments to the claims and remarks set forth in this response follow the approach discussed in the interview.

35 U.S.C. § 112 Rejection:

The rejection of claims 7 and 8 under the second paragraph of 35 U.S.C. § 112, is respectfully traversed based on the following.

It is respectfully submitted that there is no indication given in the specification, or implied by the claims, that the terms are being used in a manner contrary to their ordinary meaning. The detailed description of the preferred embodiments of the present invention describe how the cameras may be moved relative to each other and provide explicit support for the language in claims 7 and 8. Specifically, the detailed description provides, *inter alia*:

[0050] In control of the position or posture of each of the cameras 11 and 21, control may be so performed that the pan mechanisms 12 and 22 make the cameras 11 and 21 move symmetrically, and the tilt mechanisms 13 and 23 make the cameras 11 and 21 move synchronously. Thereby the mechanisms are simplified and the control is facilitated, leading to the simplified processing in the two-dimensional processing portion 41 and the stereo processing portion 42.

(page 14, lines 12-20)

Thus, the current specification provides literal support for the language of the claims and makes clear that the phrases in the claims refer to the type of control described in the specification.

It is also noted that MPEP 2173.02 directs that:

The examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph, is whether the claim meets the threshold requirements of clarity and precision, *not whether more suitable language or modes of expression are available*.

When the examiner is satisfied that patentable subject matter is disclosed, and it is apparent to the examiner that the claims are directed to such patentable subject matter, he or she should allow claims which define the patentable subject matter *with a reasonable degree of particularity and distinctness*.

Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire.

Here, the present specification provides a description of how the cameras may be moved relative to each other and provides literal antecedent support for the language in claims 7 and 8. There is no indication that the terms are being used in a manner contrary to their ordinary meaning. For this reason, the claims are considered to be clear and definite and to comply with the requirements of section 112.

Accordingly, it is respectfully requested that the rejection of claims 7 and 8 under the second paragraph of 35 U.S.C. § 112, be reconsidered and withdrawn.

35 U.S.C. § 103(a) Rejections:

The rejection of claims 1, 2, 3, and 6-8 under 35 U.S.C. § 103(a), as being unpatentable over Kondo et al. in view of Kawashima et al., is respectfully traversed based on the following.

The present claims are directed to a system which may be suitable for detecting objects for surveillance and/or robotic applications. As described in the present specification, different ones of the disclosed embodiments employ at least two cameras to perform two-dimensional and stereoscopic measurements to detect objects. By providing a system that can perform object detection in two manners and which selectably performs the two-

dimensional and stereoscopic processes to detect objects using the same cameras, a simplified system can be achieved which varies the type of object detection process used so as to balance speed and accuracy.

This can be seen in claim 1 which, as presently amended, recites:

A measurement system for measuring an object based on images obtained by plural cameras, the system comprising:
a positional control portion for controlling positions of the cameras to change photographing directions of the cameras;
a two-dimensional measurement portion for conducting two-dimensional measurement of the object based on the image of the object, the image being obtained by at least one of the cameras;
a stereoscopic measurement portion for conducting stereoscopic measurement of the object based on the images of the object, the images being obtained by at least two of the cameras, said at least two cameras including at least the camera for providing an image for the two-dimensional measurement portion; and
a switching portion for switching between the two-dimensional measurement portion and the stereoscopic measurement portion to perform an operation.

Thus, claim 1 as presently presented, claims an apparatus which uses plural cameras and which processes image data from one or more of the cameras through a two-dimensional measurement portion and/or a stereoscopic measurement portion. The system also includes a switching capability for switching image processing between the two measurement portions. Notably, the system is configured such that the stereoscopic measurement portion, which uses image data from at least two cameras, uses image data from at least one camera which is the same as the camera that provides image data for the two-dimensional measurement portion. Thus, in the system of claim 1, image data from common cameras is switched between the two-dimensional measurement portion and the stereoscopic measurement portion.

An example of this is described in the present specification where it describes:

[0042] Generally, the position of each of the cameras 11 and 21 is so controlled that each of the cameras 11 and 21 shoots a different range and faces a different direction, and each of the cameras 11 and 21 is so controlled

that wide-angle zooming is achieved . . . During the period when each of the cameras 11 and 21 shoots a different range, the controller 43 switches the setting so that the images D1 and D2 are processed by the two-dimensional processing portion 41. . .

[0043] When an intruder is detected, for example, position control and zooming control of each of the cameras 11 and 21 are so performed that both the cameras 11 and 21 magnify the intruder for photographing the same. Stated differently, both the cameras 11 and 21 photograph ranges including the intruder, the ranges being overlapped with each other. The controller 43 switches the setting so that the images D1 and D2 are processed by the stereo processing portion 42.

Thus, as described in the specification, when stereoscopic measurement is performed on the image data, image data is processed from at least two cameras (i.e., cameras 11 and 21) including at least one of the cameras which is also used to provide image data for the two-dimensional measurement (i.e., either camera 11 or 21). Thus, the specification describes that image data from common cameras is switched between the two-dimensional measurement portion and the stereoscopic measurement portion.

In contrast to the invention of claim 1, Kondo et al. discloses a system that uses both a two-dimensional measuring section and a three dimensional measuring section to operate a three dimensional reproduction apparatus. As is acknowledged in the present office action, Kondo et al. does not disclose that the image acquisition device(s) are a plurality of cameras or that the direction or position of the cameras are controlled. Moreover, Kondo et al. also fails to disclose or suggest that processing of image data from a plurality of common cameras is switched between two and three dimensional measurement modes, as required by claim 1.

The present office action asserts that Kondo et al. has only one image acquisition device, the light receive window 14 (paragraph 6 of OA, page 4). However, it is respectfully submitted that Kondo et al. does not disclose any detail about any image acquisition device and, instead, only states that the image is acquired. To surmise whether the system of Kondo et al. has one or more image acquisition devices and/or how they are operated would be pure conjecture and would not be clearly implicit to one of ordinary skill in the art.

In order to render the invention of claim 1 obvious, the cited references, singly or in combination, must disclose each limitation of the claimed invention. Here the present office action acknowledges that Kondo et al. by itself does not disclose or suggest all of the limitations of claim 1. Instead, Kawashima et al. is added in order to show a system with moveable cameras whose position can be changed to track movement.

While Kawashima et al. may disclose multiple moveable cameras, it does not disclose a system which conducts stereoscopic object measurement, much less a system where image data from common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion so that image processing from the common cameras is changed between the two image processing modes. Thus, even if Kondo et al. and Kawashima et al. were combined, the combination would still fail to disclose, suggest or teach a system where image data from (at least one) common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion.

Because neither Kondo et al. nor Kawashima et al. disclose, suggest or teach a system where image data from common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion, these references cannot render obvious the invention of claim 1.

Claims 2-3 and 6-8 depend from claim 1 and thus are also non-obvious over the combination of Kondo et al. and Kawashima et al. for at least the same reasons as claim 1.

Accordingly, it is respectfully requested that the rejection of claims 1, 2, 3, and 6-8 under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., be reconsidered and withdrawn.

The rejection of claim 4 under 35 U.S.C. § 103(a), as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Fridge, is respectfully traversed based on the following.

Claim 4 depends from claim 1. The present office action relies on Kondo et al. and Kawashima et al. for the limitations of claim 1, and adds Fridge for the proposition that stereoscopic measurements may be performed by cameras that photograph overlapping ranges.

While Fridge may disclose using multiple cameras with overlapping photographing regions, Fridge does not disclose the limitations of claim 1, which are discussed above with respect to Kondo et al. and Kawashima et al. Specifically, Fridge does not disclose a system where image data from common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion so that image processing from the common cameras can be interchanged between the two different types of image processing modes.

Accordingly, because Fridge does not cure the deficiency of Kondo et al. and Kawashima et al. to render obvious claim 1, Fridge in combination with the other two references also cannot render obvious claim 4.

Accordingly, it is respectfully requested that the rejection of claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Fridge, be reconsidered and withdrawn.

The rejection of claim 5 under 35 U.S.C. § 103(a), as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Fridge and Yamashita et al., is respectfully traversed based on the following.

Claim 5 depends from claim 1. The present office action relies on Kondo et al. Kawashima et al. for the limitations of claim 1, and adds Fridge for the proposition that stereoscopic measurements may be performed by cameras that photograph overlapping ranges and then adds Yamashita et al for the proposition that, ostensibly, switching may be performed between 2D and 3D portions based on motion in a 2D image.

As noted above, while Fridge may disclose using multiple cameras with overlapping photographing regions, Fridge does not disclose the limitations of claim 1, which are discussed above with respect to Kondo et al. and Kawashima et al. Specifically, Fridge does not disclose a system where image data from common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion so that image processing from the common cameras can be interchanged between the two different types of image processing modes.

Yamashita et al discloses a method of receiving a 2D image signal and, then, processing the 2D image signal to generate a 3D image. Yamashita et al also disclose circuits and computations which may be used to perform this conversion.

The present office action suggests that Yamashita et al discloses switching from a 2D measurement to a stereoscopic measurement when there is movement in the two-dimensional measurement. (paragraph 12, page 8). This is respectfully traversed as being contrary to the disclosure. As noted above, Yamashita et al discloses receiving a 2D image signal and processing that 2D image signal to generate an apparent 3D image. So, as an initial matter, Yamashita does not disclose a 2D measurement portion and a 3D measurement portion at all. Instead, Yamashita discloses a 2D image obtaining portion and an interpolation system to generate from the 2D image an apparent 3D image.

Further, Yamashita et al does not suggest switching from 2D measurement to 3D measurement when motion is detected in the 2D image. Instead, Yamashita discloses that when a 2D image is to be converted to a 3D image, the 2D to 3D conversion can be performed two different ways: “3D moving image conversion” and “3D still image conversion.” The cited portion of Yamashita cited by the office action (col. 19, lines 51-55) disclose that when a 2D image includes both a moving portion and a still portion these two different portions can be converted to apparent 3D by different conversion processes. I.e., the 2D moving portion can be converted to 3D by the “3D moving” image conversion technique, while the 2D still portion can be converted to 3D by the “3D still” image conversion

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technique. Thus, nowhere does Yamashita disclose, suggest or teach that when movement is detected in a 2D image that detection triggers a switch to from 2D measurement to stereoscopic measurement of an object. Instead, in Yamashita, the 2D image is always converted to an apparent 3D image regardless of whether motion is detected and the particular conversion technique selected may be affected by whether the portion of the 2D image is a moving portion or still portion.

As noted above, Claim 5 of the present application requires performing a 2D measurement of an object with at least one camera and, when the 2D measurement detects movement of the object, switching to operate the stereoscopic measurement portion. Notably, claim 1 also requires that the stereoscopic measurement portion be performed with at least two cameras, where one of the two cameras is the same as the one camera used for 2D measurement. Plainly the requirements of claim 5 are entirely different than the system of Yamashita which merely converts 2D images into apparent 3D images.

For the foregoing reasons it is apparent that the combination of Kondo et al., Kawashima et al., Fridge, and Yamashita fail to disclose each limitation of claim 5.

Moreover, notwithstanding the fact that these four references fail to disclose every limitation of claim 5, the attempt to combine these four references also appears to be without sufficient motivation or suggestion. Sections 2141.01 and 2143 of the MPEP states that the teaching or suggestion to make the claimed invention must be found in the prior art – not in applicant's disclosure – and that impermissible hindsight must be avoided in formulating the rejection. Impermissible hindsight includes using the inventor's own teachings as a roadmap to piece together prior art references in ways or combinations that would not have been obvious at the time of the invention. In formulating the current four-way obviousness rejection, each reference is justified as applying to 2D or 3D imaging or camera control or motion detection, but other than relating to imaging, the only suggestion to collect these particular features appears to come solely from the current inventor's own teachings.

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Accordingly, based on the foregoing, it is respectfully requested that the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Fridge and Yamashita et al., be reconsidered and withdrawn.

The rejection of claims 9 and 10 under 35 U.S.C. § 103(a), as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Greenberg et al., is respectfully traversed based on the following.

Claims 9 and 10 depend from claim 1. The present office action relies on Kondo et al. and Kawashima et al. for the limitations of claim 1, and adds Greenberg for the proposition that an alarm signal may be output.

While Greenberg may disclose a system capable of being trained to recognize patterns, Greenberg does not disclose the limitations of claim 1, which are discussed above with respect to Kondo et al. and Kawashima et al. Specifically, Greenberg does not disclose a system where image data from common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion so that image processing from the common cameras can be interchanged between the two different types of image processing modes.

Accordingly, because Greenberg does not cure the deficiency of Kondo et al. and Kawashima et al. to render obvious claim 1, Greenberg in combination with the other two references also cannot render obvious claims 9 or 10, which depend from claim 1.

Accordingly, it is respectfully requested that the rejection of claims 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Greenberg et al., be reconsidered and withdrawn.

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The rejection of claim 11 under 35 U.S.C. § 103(a), as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Mertelmeier et al., is respectfully traversed based on the following.

Claim 11 depends from claim 1. The present office action relies on Kondo et al. and Kawashima et al. for the limitations of claim 1, and adds Mertelmeier et al. for the proposition that high-resolution and low-resolution images can be used.

While Mertelmeier et al. may disclose use of high-resolution and low-resolution images, Mertelmeier et al. does not disclose the limitations of claim 1, which are discussed above with respect to Kondo et al. and Kawashima et al. Specifically, Mertelmeier et al. does not disclose a system where image data from common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion so that image processing from the common cameras can be interchanged between the two different types of image processing modes.

Accordingly, because Mertelmeier et al. does not cure the deficiency of Kondo et al. and Kawashima et al. to render obvious claim 1, Mertelmeier et al. in combination with the other two references also cannot render obvious claim 11.

Moreover, the combination of Mertelmeier et al. with the other references appears to lack the required suggestion or motivation. Mertelmeier et al. addresses a method to calculate volume images from two-dimensional projection images, for applications such as for a CT apparatus. The mere fact that Mertelmeier et al. calculates both a low-resolution projection image and a high-resolution projection image, does nothing to suggest either the current invention or the combination of Mertelmeier et al. with the other references. The only apparent motivation to select Mertelmeier et al. is based on a hindsight selection using the claims of the current application as a roadmap. While the office action states that the motivation to combine would be to provide a more flexible system, this suggestion appears to come only from the current claims, not from the prior art. As noted in the MPEP 2143.01, the mere fact that the teachings of the references could be combined or that to do so would be

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within the capabilities of one of ordinary skill in the art is not sufficient to establish *prima facie* obviousness.

Accordingly, based on the foregoing, it is respectfully requested that the rejection of claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Mertelmeier et al., be reconsidered and withdrawn.

The rejection of claim 12 under 35 U.S.C. § 103(a), as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Geng, is respectfully traversed based on the following.

Claim 12 depends from claim 1. The present office action relies on Kondo et al. and Kawashima et al. for the limitations of claim 1, and adds Geng for the proposition that the cameras include a color filter and, ostensibly, that when processing is performed, that only image data of pixels corresponding to only a color filter with a particular color are used.

While Geng may disclose use of a color camera, including a color CCD with color filters, Geng does not disclose, suggest or teach that when a CCD with color filters is used, only data from a particular color pixels should be used. This concept is disclosed only in the current application and claims. Instead, Geng teaches that in a CCD of the type having color filters over each pixel, that each color filter has a particular transmittance function $\tau(\lambda)$. As a result, the RGB signal response from the CCD will be a function of many factors (see Eq. 5 and col. 4, lines 55-62). Geng does not disclose or suggest that only data from pixels having one specific color of color filter should be processed.

Geng also does not disclose the limitations of claim 1, which are discussed above with respect to Kondo et al. and Kawashima et al. Specifically, Geng does not disclose a system where image data from common cameras is switched for processing between a two-dimensional measurement portion and the stereoscopic measurement portion so that image processing from the common cameras can be interchanged between the two different types of image processing modes.

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Accordingly, Geng neither cures the deficiency of Kondo et al. and Kawashima et al. to render obvious claim 1, nor does it disclose suggest or teach the added limitations of claim 12.

Finally, once again, the combination of Kondo et al., Kawashima et al. and Geng lacks the motivation or suggestion to combine the references. The teaching in Geng about CCD color filters is incidental and unrelated to any possibility of using pixels of certain "color" while not using pixels of other "color." Thus, Geng appears to have been selected for the obviousness rejection solely by using the limitations of current claims as a shopping list. If Geng, Kondo et al., Kawashima et al. were considered by one of ordinary skill in the art, not only would there be a lack of motivation to combine them but even if they were forced together (assuming for the sake of argument that it is possible to do so), the combination would still not yield the invention of claim 12.

Accordingly, for the foregoing reasons it is respectfully requested that the rejection of claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Kawashima et al., and further in view of Geng, be reconsidered and withdrawn.

In view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are respectfully requested.

This Amendment increases the number of independent claims by 3 from 1 to 4 (3 claims previously paid for) and increases the total number of claims by 18 from 12 to 30 (20 claims previously paid for), but does not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$700.00 to be charged to Sidley Austin LLP Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin LLP Deposit Account No. 18-1260.


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If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee, and not submitted herewith should be charged to Sidley Austin LLP Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

By: _____


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